

REMARKS

In view of the above amendments and the following remarks, reconsideration and further examination are requested.

The specification and abstract have been reviewed and revised to make a number of editorial revisions. No new matter has been added. Enclosed are marked-up versions of the specification and abstract indicating the changes.

Claims 56 and 84 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Claims 56 and 84 have been amended so as to more clearly recite that the abrading plate is shaped by pressing while in a container during its manufacturing process. As a result, withdrawal of this rejection is respectfully requested.

Claims 1, 2, 4-8, 42-47 and 71 have been rejected under 35 U.S.C. §102(e) as being anticipated by Somekh (US 6,435,945). Claims 3, 74-76, 99 and 101-104 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Somekh in view of Southwick (US 5,782,675). Claims 44, 71-73, 77-81 and 96-98 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Somekh. Claims 54-7, 82-95 and 100 have been indicated as containing allowable subject matter. The Applicants would like to thank the Examiner for this indication of allowable subject matter.

Claims 1, 5, 71, 74, 96 and 99 have been amended to further distinguish the present invention from the references relied upon by the Examiner. Claims 4, 42-47, 77 and 79-81 have been canceled without prejudice or disclaimer to the subject matter contained therein. New claims 105 and 106 have been added.

In addition, claims 1-3, 5-8, 54-57, 59, 60, 62-74, 76, 78 and 82-104 have been amended to make a number of editorial revisions. These revisions have been made to place the claims in better U.S. form. None of these amendments have been made to narrow the scope of protection of the claims, nor to address issues related to patentability and therefore, these amendments should not be construed as limiting the scope of equivalents of the claimed features offered by the Doctrine of Equivalents.

The above-mentioned rejections are submitted to be inapplicable to the claims for the following reasons.

Claim 1 is patentable over Somekh, since claim 1 recites a method for polishing an object by using an abrading surface made of abrasive particles and a binder, the method including polishing the object by the abrading surface while supplying a liquid not containing any abrasive particles for a determined time period, and further polishing the object by the abrading surface while supplying abrasive particles so as to perform additional removal of a surface material to remove a specific film thickness. Somekh fails to disclose or suggest the polishing operations as recited in claim 1.

Somekh discloses a polishing method in which a substrate is initially polished at a polishing station 25a with a polishing liquid 50a that does not contain abrasive particles and a fixed-abrasive polishing pad 100. The polishing method then has the substrate further polished at polishing stations 25b and 25c with standard (soft) polishing pads 110. (See column 3, lines 27-33, column 4, line 64 - column 5, line 6, and column 6, lines 56-67).

Based on the above description, it is apparent that Somekh does not disclose that the fixed-abrasive polishing pad 100 is used to polish the substrate while supplying a liquid not containing abrasive particles and then also used to further polish the substrate while supplying abrasive particles. Instead, Somekh uses standard polishing pads 110 to perform the further polishing using abrasive particles. Therefore, Somekh requires the use of multiple polishing stations 25a-25c to polish the substrate. As a result, it is apparent that Somekh fails to disclose or suggest the present invention as recited in claim 1.

Further, Southwick is relied upon as disclosing performing polishing while concurrently dressing an abrading surface with a liquid not containing abrasive particles. However, even if Southwick does disclose these features, Southwick also fails to disclose or suggest the above-mentioned features of claim 1.

As for claim 5, it is patentable over Somekh and Southwick for similar reasons as set forth above in support of claim 1. That is, claim 5, like above claim 1, recites a polishing apparatus having, in part, a device for supplying a liquid not containing abrasive particles to a polishing interface, and a surface material removal device for performing additional material removal by supplying abrasive particles on the abrading surface, the surface material removal device being integrally mounted in the polishing apparatus, which features are not disclosed or suggested in the references.

Claim 71 is patentable over Somekh and the combination of Somekh and Southwick, since claim 71 recites a method for polishing an object using an abrading surface made of abrasive particles and a binder binding the abrasive particles, the method including, in part, dressing the abrading surface by a diamond dresser for moderately roughening the abrading surface. The combination of Somekh and Southwick fails to disclose or suggest dressing the abrading surface as recited in claim 71.

Somekh discloses the use of a fixed abrasive polishing pad 100 to polish a substrate. However, Somekh also discloses that the fixed abrasive polishing pad 100 does not require conditioning (dressing). (See column 6, lines 20-27 and lines 43-46). Therefore, it is apparent that Somekh fails to disclose or suggest the dressing operation recited in claim 71.

Southwick discloses a pad refurbishing device 111 that has a non-abrasive refurbishing element 170 mounted to a refurbishing element carrier 156 of a carriage assembly 150. The non-abrasive refurbishing element 170 has a non-abrasive contact medium 172 that engages with a planarizing surface 142 of a fixed-abrasive pad 140 to scrub waste matter from the planarizing surface 142 without abrading or damaging raised features 143 located on the fixed-abrasive pad 140. The non-abrasive refurbishing element 170 is preferably a brush. (See column 4, lines 26-37).

Based on the above description, it is apparent that pad refurbishing device 111 does not perform dressing as recited in claim 71. Instead of dressing the planarizing surface 142 of the fixed-abrasive pad 140 with a diamond dresser for moderately roughening the planarizing surface 142, the pad refurbishing device 111 conditions the planarizing surface 142 with a brush specifically designed not to abrade the raised features 143 on the fixed-abrasive pad 140. As a result, it is apparent that the combination of Somekh and Southwick fails to disclose or suggest the present invention as recited in claim 71.

As for claim 96, it is patentable over Somekh and the combination of Somekh and Southwick for similar reasons as set forth above in support of claim 71. That is, claim 96, like above claim 71, recites a polishing apparatus having, in part, a diamond dresser for dressing and roughening the abrading surface, wherein a pressure applied by the dresser against the abrading surface is less than 100g/cm², which features are not disclosed or suggested by the references.

Claim 74 is patentable over the combination of Somekh and Southwick, since claim 74 recites a method for polishing an object using an abrading surface made of abrasive particles and a binder binding the abrasive particles, the method including, in part, dressing the abrading surface by a dresser for roughening the abrading surface during a polishing process to generate free abrasive particles from the abrading surface. The combination of Somekh and Southwick fails to disclose or suggest dressing the abrading surface as recited in claim 74.

As discussed above with regard to claim 71, Somekh fails to disclose or suggest dressing the fixed abrasive polishing pad 100, and instead indicates that the fixed abrasive polishing pad 100 does not need any conditioning (See column 6, lines 43-46). As a result, it is apparent that Somekh fails to disclose or suggest the dressing of the abrading surface as recited in claim 74.

Further, it is apparent that Southwick also fails to disclose or suggest dressing the abrading surface by a dresser for roughening the abrading surface during a polishing process to generate free abrasive particles from the abrading surface, since, as discussed above in regard to claim 71, the pad refurbishing device 111 is designed not to abrade the raised features 143 of the fixed-abrasive pad 140. That is, the non-abrasive refurbishing element 170 of the pad refurbishing device 111 has the non-abrasive contact medium 172 that engages with the planarizing surface 142 of the fixed-abrasive pad 140 to scrub waste matter from the planarizing surface 142 without abrading or damaging raised features 143 on the fixed-abrasive pad 140. (See column 4, lines 26-37). As a result, the combination of Somekh and Southwick fails to disclose or suggest the present invention as recited in claim 74.

As for claim 99, it is patentable over the combination of Somekh and Southwick for similar reasons as set forth above in support of claim 74. That is, claim 99, like above claim 74, recites a polishing apparatus having, in part, a dresser for dressing an abrading surface for roughening the abrading surface during a polishing process to generate free abrasive particles from the abrading surface, which feature is not disclosed or suggested by the references.

Claim 78 is patentable over Somekh, since claim 78 recites a method for polishing an object having a raised and depressed pattern thereon, the method including, in part, polishing a surface of the object by making a sliding motion between the surface of the object and the abrading surface, and

supplying a liquid including a surface activator during the sliding motion. Somekh fails to disclose or suggest supplying a surface activator during a sliding motion of polishing as recited in claim 78.

Somekh discloses that the substrate is initially polished at the polishing station 25a with a polishing liquid 50a of deionized water and a chemically reactive compound that does not contain abrasive particles, and the fixed-abrasive polishing pad 100 (See column 3, lines 27-33). However, Somekh fails to disclose or suggest that the chemically reactive compound in the polishing liquid 50a is a surface activator or that the polishing liquid 50a is supplied during the polishing of the substrate with a sliding motion. One of the benefits of supplying the surface activator as recited in claim 78 is that it allows for better control of the polishing rate of the object being polished.

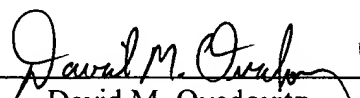
As for Southwick, it also fails to disclose or suggest supplying a surface activator during a sliding motion of polishing as recited in claim 78. As a result, the combination of Somekh and Southwick fails to disclose or suggest the present invention as recited in claim 78.


Because of the above mentioned distinctions, it is believed clear that claims 1-3, 5-8, 54-76, 78 and 82-106 are allowable over Somekh and Southwick. Furthermore, it is submitted that the distinctions are such that a person having ordinary skill in the art at the time of invention would not have been motivated to make any combination of the references of record in such a manner as to result in, or otherwise render obvious, the present invention as recited in claims 1-3, 5-8, 54-76, 78 and 82-106. Therefore, it is submitted that claims 1-3, 5-8, 54-76, 78 and 82-106 are clearly allowable over the prior art of record.

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance. The Examiner is invited to contact the undersigned by telephone if it is felt that there are issues remaining which must be resolved before allowance of the application.

Respectfully submitted,

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